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Case No.

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1983

THOMAS A. GARDNER,

Petitioner,

vs.

TEC SYSTEMS, INC., a corporation of Wisconsin, and ROY E. DOWNHAM, JACK ECKELAERT and JOHN W. FROST,

Respondents.

APPENDIX TO PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

VOL. I

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UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

THOMAS A. GARDNER,	)	
	)	
Appellant,	)	
	)	
v.	)	Appeal No.
	)	
TEC SYSTEMS, INC., et al.,	)	83-697
	)	
Appellees.	)	

DECIDED: January 12, 1984

Before MARKEY, Chief Judge, FRIEDMAN, RICH, DAVIS, Circuit Judges, NICHOLS, Senior Circuit Judge,* BALDWIN, KASHIWA, BENNETT, MILLER, SMITH, and NIES, Circuit Judges.

RICH, Circuit Judge.

Thomas A. Gardner appeals from the order and judgment of the United States District Court for the Eastern District of Wisconsin dismissing his complaint for patent infringement against appellees TEC Systems, Inc., et al. (TEC) and

*/ Judge Nichols took senior status as of October 1, 1983.

holding claims 1, 3, 4, and 8[1/] of his U.S. patent No. 3,452,447 issued July 1, 1969 (the '447 patent), invalid for obviousness under 35 USC 103. We affirm.

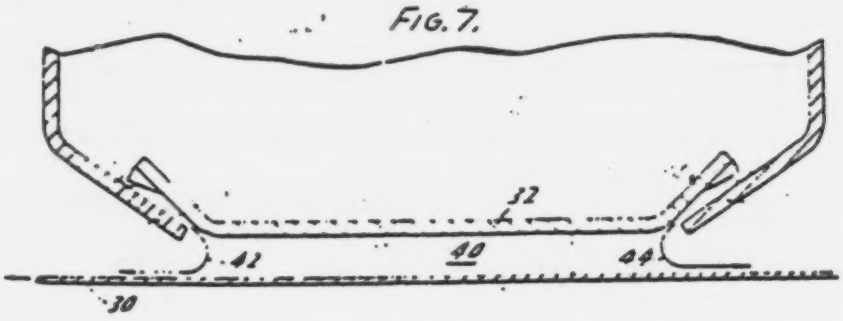
1/ In the final "SUMMARY" section of its opinion, the trial court adjudged that "the patent in suit is invalid as obvious under section 103." Gardner cites this as error because only claims 1, 3, 4, and 8 were in suit. We agree. Reading the entire opinion makes it clear that the only claims which were tried by the parties and considered by the trial court were 1, 3, 4, and 8, and that the trial court simply misstated itself in the above-quoted statement. Accordingly, we regard the decision of the trial court as being limited, as it must be, to the claims in suit, and vacate the order of the trial court to the extent it purports to hold invalid any additional claims. See Felburn v. New York Central R.R. Co., 350 F.2d 416, 420, 146 USPQ 622, 626 (6th Cir. 1965).

BACKGROUND

The Claimed Invention

The '447 patent describes and claims a device which is especially useful in drying the ink used on the high-gloss papers of which many periodicals are made. In the initial stages of the printing process, the paper is in the form of a continuous sheet called the "web." Upon leaving the printing press, the web bears ink which is still wet. Manipulation of the web thus must be accomplished without touching the web and smearing the wet ink. The device disclosed in the '447 patent supports and positions the web by floating it on one zone or between two opposed zones of static air under superatmospheric pressure. One embodiment of the invention is shown in Fig. 7 of the '447 patent, which is a fragmentary detail view in cross section, re-

produced below (here and elsewhere extraneous numbers have been omitted for clarity):



With reference to the figure, web 30 is said to be positioned by the static superatmospheric pressure in zone 40. This zone is confined on the top by suppression plate 32, on the bottom by web 30, and on the sides by partially opposed jets 42 and 44. The structure shown in the figure would normally be duplicated in an inverted position below web 30. Web 30 is shown as moving from right to left. The structure shown in the figure is re-

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ferred to by the parties as an "air bar." Gardner asserts that it prevents "fluttering" of the edges of the web, a problem which is said to have existed in prior art devices and to have caused marking of the web and smearing of the ink.

Claim 1, the only independent claim on appeal, in outline form reads as follows:

1. Means for positioning a moving web by subjecting a transverse zone spanning the web to uniform static pressure, said positioning means comprising

a suppression plate extending transversely across said web and spaced therefrom as closely as is mechanically practicable,

nozzle means no closer to the web than said plate and having slots which extend substantially continuously across said web and are spaced at opposite

sides of said plate,

the minimum spacing
between the web
and said plate
being a distance at least
approximately
twice as great as the
nozzle slot width,

the maximum spacing
of the plate from the
web
never being greater than the
width of the plate

the product
of the width of the plate
and the spacing of the
plate from the web
being less than twenty times
the nozzle
slot width,

and means
for discharging gas under
pressure through
the nozzle slots
for defining a zone of
static pressure
between the plate and
the web.

As will be developed below, the so-called dimensional limitations appearing in this claim have taken on paramount significance. These limitations are expressed in terms of the distance

between the suppression plate and the web (labelled "Y" in the specification), the nozzle slot width (also the orifice width, labelled "D" in the specification), and the width of the suppression plate, which corresponds to the distance between the jets (labelled "L" in the specification). Recasting the claim limitations using these labels, they are:

(1) that Y be as small "as is mechanically practicable";

(2) that Y be greater than or equal to 2D;

(3) that Y never be greater than L; and

(4) that the product LY be less than 20D.

The fourth limitation finds its basis in the specification in a discussion in which D is assigned a value of .030 inch and L a value of 2 inches. It is then stated that good results are achieved when Y is 3/16 inch (.1875

inch), but that performance falls off when Y exceeds .030 (sic, .3) inch. Inserting the values in (4), LY_{max} = .6 in^2 and 20D = .6 in. It is apparently from this observation that Gardner derived his requirement that LY be less than 20D.

The Prior Art and Prosecution History

The prior art patent deemed most important by the trial court in U.S. patent No. 3,181,250 to Vits (the Vits patent or Vits) entitled "Apparatus and Method of Drying Web Material by Directing Hollow Gas Jet Streams Against Opposite Faces of the Web." The general idea can be gleaned from the embodiment of the Vits dryer or air bar shown in his patent in Fig. 10, reproduced below:

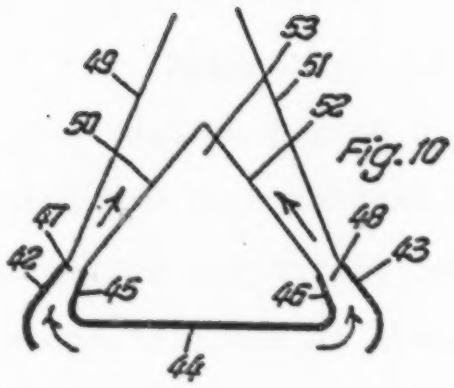


Fig. 10

In the figure, the solid lines show contours of Vits' postulated air flow. Arrows have been added to show the direction of air flow. The Vits dryer has a deflector 44 which extends the width of the web (web not shown). Bent-up edges 45 and 46 of deflector 44, together with nozzle head side walls 42 and 43, form slot nozzles 47 and 48. The air flowing from these nozzles forms, in the language of the Vits specification, "a flow-free prismatic space 53 in which a static excess pressure is built up * * *.

In this manner, a beam-shaped cushion is formed having a triangular cross section * * * Naturally, the crest edge of the cushion formed by the top of the triangle is hypothetical only, but the cushions of the drying medium, e.g., air cushions, flatten at their upper portions so that the web is supported over a relatively wide area." For a description of Vits in greater detail, see In re Stroszynski, 424 F.2d 1114, 1116, 165 USPQ 438, 439 (CCPA 1970).

Vits was a major impediment to the ultimately successful prosecution of the applications which resulted in the '447 patent. As recounted by the trial judge, the initial application was filed on September 23, 1963; all claims corresponding to those involved herein were rejected on Vits. The claims were then amended, and again rejected on Vits. Gardner then filed, after final

rejection, additional amendments and an affidavit presenting data from tests comparing his air bar with an air bar based on Fig. 10 of Vits, but differing from that shown in Fig. 10 in that it had narrower nozzles than shown therein. The purpose of this variation, as explained in the affidavit, was to make it possible to use comparable amounts of air in both devices. Gardner was attempting to show through the affidavit and the tests described therein that Vits depended on impingement or dynamic pressure, and did not teach or suggest the use of a zone of static pressure upon which Gardner's air bar depended. The examiner entered the affidavit, but nevertheless adhered to his rejection. Gardner then filed his first continuation application, the claims of which were also ultimately finally rejected on Vits. Gardner then filed another

amendment after final rejection, which the examiner refused to enter. The significance of this amendment and the refusal to enter it will be seen in connection with the next reference to be discussed. Gardner then filed a third continuation application, and amended the claims to their present form essentially by adding the dimensional limitations. The examiner again rejected the claims, but, after argument on behalf of Gardner, relented. The '447 patent issued July 1, 1969, after nearly six years of prosecution, the focus of which had been the patentability of the invention claimed therein over that disclosed by Vits.

Another prior art patent which the trial judge described as important is U.S. patent No. 3,097,971 to Carlisle et al. (the Carlisle patent, or Carlisle). Entitled "Method of and

Apparatus for Supporting or Guiding Strip Material," it is concerned primarily with supporting materials such as steel strips, but expressly extends application of the principles taught therein to "wide elongate material of various kinds." Fig. 6 of Carlisle

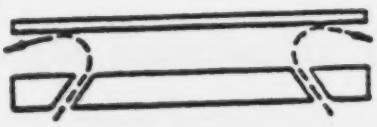


FIG. 6.

shows diagrammatically the use of angled orifices which "enhances the cushion effect of the fluid.". In short, Carlisle shows, as does Vits, the use of partially opposed jets to support a continuous sheet of material.

Carlisle was not cited by the examiner during prosecution of Gardner's initial application and two continuation applications. Gardner re-

quested the examiner to make Carlisle of record in the remarks section of his amendment after final rejection in the first continuation application. It will be recalled, however, that the examiner in his discretion refused to enter that amendment. Thus, at trial, the parties contested whether Carlisle had been considered by the examiner at all, the significance they attached to this fact being, in the words of the trial court, whether the "patent in suit is not entitled to a presumption of validity as to Carlisle."

This last-quoted passage is expecially significant in that it contains the trial court's only mention of the presumption of validity. Despite its awareness of controversy concerning the presumption, the trial court never concluded: (1) whether Carlisle had in fact been considered by the examiner;

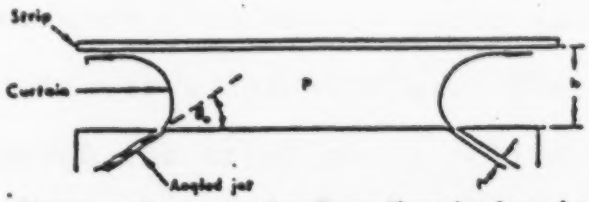
(2) whether Carlisle shows anything not shown in Vits, which was exhaustively considered by the examiner; (3) who had the burden of proving facts concerning validity or invalidity at trial; and (4) by what standard of proof those facts had to be shown.

The final prior art references deemed important by the trial court on the question of nonobviousness are two articles, both British. The first is unattributed and entitled "The Hover Pulley." It appeared in the January 1962 issue of Metallurgia. A "hover pulley" is described therein as means for supporting light gauge strip by use of a fluid cushion between the strip and guide surface, the fluid being introduced therebetween through a series of annular jets. The second article is entitled "The Support of Thin Steel Strip on Air Cushions." It was written

by Jaffrey and Boxall, and was apparently first published in May 1963. As stated therein,

> The principle employed in the Hovercraft* * * is that a pressure rise occurs within the area enclosed by annular (slot) jets, if these jets are in close proximity to a surface (Fig. 3). Air issuing from the slot jets forms, in effect, a curtain which contains a cushion of air at a pressure greater than atmospheric. In our application of the principle, moving steel strip is supported on this cushion.

The Fig. 3 referred to in the above passage follows:



3 *Diagrammatic representation of a two-dimensional annular jet*

While there is no dispute that neither of the two British articles was considered by the examiner, there is a dispute in this appeal over whether the Jaffrey and Boxall article is available

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as prior art. As Gardner points out, apparently for the first time on appeal, the article is not available under 35 USC 102(b) because its May 1963 publication date is not a full year before the September 1963 priority date of the '447 patent. TEC counters that it is available under §102(a) (as prior to Gardner's invention), to which Gardner responds that the trial court found that he had sold one of his air bars in April 1963, so that Jaffrey and Boxall is no more a reference under §102(a) than it was under §102(b). The extent to which the trial court relied upon the Jaffrey and Boxall article in reaching its determination is unclear.

The four references just discussed--Vits, Carlisle, and the two British articles -- are the only ones the trial court categorized as "important." There were two additional references --

U.S. patent No. 3,041,739 to Meier-Windhorst and reissue patent No. 24,144 to Dungler -- which it considered to be of "considerably lesser value." Neither patent seems to have had any detectable bearing on either the trial court's analysis or the arguments of the parties in this appeal. We will therefore not refer to them again.

The Trial Court

Briefly, the trial court recounted the '447 prosecution history, and opined that Gardner's variation of the nozzle width of his reconstruction of Vits used in tests comparing it with his own air bar rendered those tests "of little probative value." The trial court then essentially correctly laid out the tripartite test of nonobviousness as set forth by the Supreme Court in its application of 35 USC 103 in Graham v. John Deere, 383 U.S. 1 (1966). After turn-

ing to a description of the claimed subject matter, however, the trial court unfortunately and unnecessarily lapsed into enunciating what it apparently perceived to be an additional requirement for patentability:

> Thus, the claims represent a combination of old elements. To be patentable such a combination must produce a synergistic result, that is, produce a result greater than the sum of the parts. Andersons-Black Rock v. Pavement [sic; Pavement Salvage] Co., 396 US. 57 (1969).

Having lapsed, however, the trial court then returned to the proper course and undertook a complete tripartite analysis of obviousness. As to the level of skill in the art, the trial court found it to be that of a graduate engineer "with a number of years of experience visualizing, designing, fabricating and testing web handling and treating equipment."

As to the scope and content of

the prior art, the trial court found that Vits was by far the most important reference, concluding:

> Thus it clearly appears that in 1961, Hilmar Vits was not only teaching the use of a cushion of excess static pressure to float a dry air cushion, but was also teaching that the zone of excess static pressure was occupied by a medium "entirely at rest." To the Court this sounds like exactly the concept that Gardner argued so vigorously to the examiner * * * that the zone [in his invention] was one in which there was "no flow of air through or into or parallelling the zone of status [sic] pressure."

The trial court then read claim 1 of the '447 patent on the Vits dryer, finding in Vits every element recited in claim 1 except for the dimensional limitations, which the court viewed as "artificial dimensional limitations that add nothing to the claims, that are of no constructive significance, and are essentially meaningless." The trial court then went on to find that the additional limitations of dependent

claims 3, 4, and 8 were all met by Vits and summed up by saying that the only actual difference between the claimed invention and Vits' dryer was that Vits' baffle plate 44 was not as close to the web as were the nozzles. The court said, however, that experiments conducted by TEC's expert, Dr. Daane, "demonstrated clearly that a Vits embodiment developed both static and kinetic energy, that there was no difference in the type of static pressure under the Vits or the Gardner teachings, and that the Vits device worked entirely satisfactorily in 'floating' a web."

After a brief and inconclusory discussion of the remaining references, the court concluded (finding numbers omitted):

> Having proceeded through the analysis required under Graham v. John Deere Co., supra, the Court expressly finds that the subject matter of the patent claims in issue would have been obvious to a person skilled in the art at the time the alleged invention was made.
>
> The Court further finds that the combination of old elements does not produce a synergistic result, i.e., a greater result than the sum of the parts.
>
> Nor can the Court find any secondary factors such as long felt, unsolved needs, failure of others in the field, or commercial success to influence the determination of obviousness.

The court then denied TEC's request for attorney fees on the ground that this case is not extraordinary within the meaning of 35 USC 285.

After trial, Gardner moved for additional discovery, a new trial, and for an order under Fed. R. Civ. P. 59(e) to alter or amend the judgment by adopting additional findings and conclusions regarding infringement, an issue the trial court had not reached due to its

determination on validity. These motions were denied.

Gardner's Arguments on Appeal

Gardner contends that the trial court erred, inter alia, in[2/]:

1) ignoring the statutory presumption of validity;

2) using the Jaffrey and Boxall article as prior art;

3) applying a test for obviousness

2/ Gardner also alleges error in the trial court's disposition of matters pertaining to his assertion that the individual appellees here, who were defendants below, should have been found personally liable because TEC was merely their corporate alter ego. The trial court refused to credit this assertion, and so dismissed the suit as to them. The additional discovery Gardner sought was to help him to substantiate this claim. Gardner also moved to substitute W. R. Grace & Co. as a defendant as TEC's successor in interest. The trial court denied this motion as well. Due to our disposition on validity, we have no occasion to pass on these matters.

"intertwined with elements of the requirements for synergism," or in holding synergism to be a requirement for patentability; and

4) refusing to credit Gardner's evidence of commercial success.

OPINION

A conclusion on obviousness is one of law and subject to full and independent review on this court. Sarkisian v. Winn-Proof Corp., 688 F.2d 647, 651 (9th Cir. 1982). Our task is thus to consider the facts, either as properly found by the factfinder below or as stipulated to or otherwise uncontested by the parties, and reach our own conclusion on obviousness. We then either affirm the trial court if we agree with its conclusion, reverse if we do not, or vacate and remand for new or additional findings, if, in our view, the record lacks facts essential to formu-

lating a conclusion. Affirmance does not require that we and the trial court reach the conclusion in precisely the same fashion. If, on the essential facts, arrived at through proper application of the relevant law, we agree with the trail court's conclusion, any error concerning nonessential facts ascribed to the trial court in reaching that conclusion is harmless and not a basis for reversal. See 28 USC 2111.

35 USC 103, as applied by the Supreme Court in Graham v. John Deere, makes the factual inquiry into the scope and content of the prior art the appropriate starting point for consideration of obviousness. Thus, we start with the trial court's essentially unchallenged finding that Vits is unquestionably the most pertinent prior art. After painstaking review of the opinion of the trial court and the briefs on appeal,

we have found neither a finding nor a contention which suggests that any of the remaining references teach anything not found in Vits. We therefore premise our reasoning, as did the trial court in essence, on Vits. Doing so obviates the need to consider Gardner's argument that the Jaffrey and Boxall article is not prior art, and whether Carlisle had been considered by the examiner.

We focus next on the differences between the claimed invention and the prior art. Again, we see no clear error in the trial court's finding that Vits discloses the invention of the claims in suit except for their dimensional limitations. TEC argues that these dimensional limitations are likewise met by Vits as well as by devices disclosed in other references, but points to no findings or evidence of record beyond the drawings in the refer-

ences for support. The truth of the proposition is not self-evident. TEC's contentions in this regard are no more than unsupported argument of counsel, and for that reason unpersuasive. Differences between the prior art and the claimed invention therefore remain in the dimensional limitations recited in claim 1.

Finally, we expand our focus and ask the ultimate legal question whether these differences are such that the claimed invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made. Recasting the question in terms of the specific facts of this case, we must decide whether an air bar which has dimensional proportions falling within the ranges recited in claim 1 would have been obvious. By virtue of the statutory presumption of

validity, 35 USC 282, it was up to TEC, the party asserting invalidity, to prove facts which would permit the trial court to answer this question in the affirmative.

It appears from the trial court's opinion, which is cast in the form of a short introduction and 102 "Findings of Fact" (which include some conclusions of law), that TEC tried to meet this burden by proving that the dimensional limitations do not aid in defining nonobvious subject matter because an air bar having relative dimensions falling within the specified proportional ranges performed no differently than an air bar constructed according to the teachings of Vits so that recitation of those limitations does not serve to distinguish over the prior art in any significant way. Whether meeting the dimensional limitations of claim 1 has no effect on

air bar performance is, of course, a fact which TEC had the burden of proving. As for the standard of proof TEC had to meet to prove it, we note that the claims were allowed over Vits, and that no reference shows more than does Vits. It is thus perfectly clear that TEC in effect asked the trial court to cover precisely the same ground as that covered by the PTO in its quasi-judicial determination of patentability that it is authorized and required by statute to render. Therefore, TEC's burden on this point was a heavy one.

Bearing the foregoing in mind, we arrive at the nub of this case. If we are to agree with the trial court, we must have from it a finding supported by the record that TEC proved by clear and convincing evidence that a Gardner air bar coming with the claims of the '447 patent is not in any significant

respect different from similar devices available in the prior art because structural differences over the prior art do not necessarily result in differences in performance over the prior art. Since there is no express finding to this effect, we scrutinize the court's opinion to see whether we can infer such a finding from all that is said therein.

It is useful at this point to recapitulate in greater detail precisely what the trial court said about the dimensional limitations. As to the requirement that the suppression plate be as close to the web "as mechanically practicable," the trial court viewed it as a "limitation without a function." As to the remaining dimensional limitations, it said:

> The Court further concludes that the balance of the elements of plaintiff's Claim 1 represent limitations that do not really differentiate Gardner '447 from the Vits * * * teachings and do not affect the utilization of the principles of fluid dynamics taught by Vits. [T]he Court views [these limitations] as artificial dimensional limitations that add nothing to the claims, that are of no constructive significance, and are essentially meaningless. The evidence at trial never showed that departing from these formulae would necessarily cause an air bar to function or fail. In other words, these claims [sic, claim limitations] are irrelevant.

Later in its opinion, the trial court repeated its position:

> All of the prior art air bars, despite different nozzle sizes, plenum pressures, nozzle directions, or other variations do, in the Court's view, depend upon the creation of a zone of superatmospheric pressure to support the web. Whether that support is weak or strong, uniform or variable, progressive or not, as well as the proportions of static pressure and kinetic pressure are matters which vary as these factors are manipulated. But they do not exhibit qualitatively different phenomena, all used static pressure to some degree; all have suppression plates or structures equivalent thereto; all have nozzle slots extending transversely of the web,

and spaced on opposite sides of the suppression plate or similar structure. The dimensional limitations of Gardner's '447 are essentially meaningless.

Finally, in another opinion rendered a few months later disposing of several Gardner post-trial motions, the court made the following additional remarks:

> Having considered carefully all of the trial testimony and the numerous demonstrations and exhibits, the Court previously concluded that these requirements were empty formulae that had no relationship to any of the principles of fluid mechanics or phenomena thereof which were demonstrated in the trial. To this Court, they were incantations that may have superficially made the application sound like something unique and inventive but had no real function. So far as this poor observer could conclude, adherence to these dimensional mandates did not produce any discernible result or any synergistic [sic] effect. Nor did departure therefrom cause a failure of the web support. Surely, the patent law does not attach uniqueness to dimensional claims that have no significance in the operation of the claimed invention.

These extracts, and the opinion as a

whole, lead us to conclude that the trial court was completely convinced that the dimensional limitations of claim 1 are no more than "window dressing," to use our own term. This conclusion is not based solely on the trial court's occasional and arguable fortuitous use of the word "clearly," although that is a valid consideration. Rather, it is based on everything the trial court said, and the emphatic and unambiguous manner in which it chose to say it. Although it never said so in precise terms, the trial court was unquestionably of the firm conviction that the proofs adduced at trial showed clearly and convincingly that the dimensional limitations of claim 1 failed to particularly point out a feature of an air bar which performed any differently from prior art bars, in other words, that those limitations are a verbal difference only.

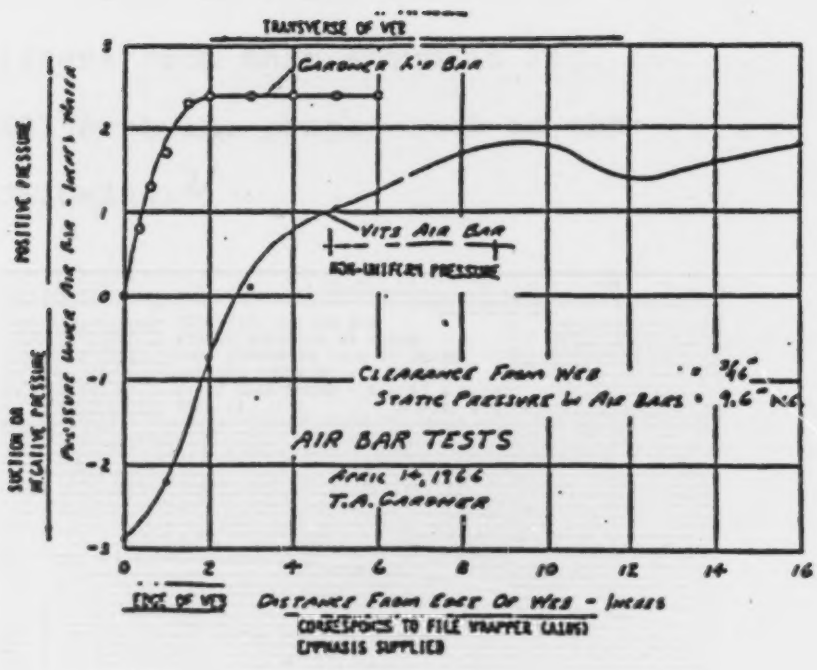
We thus proceed on the basis that the trial court, in essence, made an explicit finding to that effect.

We next determine our standard of review of this inferred finding. Inasmuch as this finding is factual in nature, it would normally be reviewed under the "clearly erroneous" rule. Fed. R. Civ. P. 52(a). Gardner argues, however, that the factual determinations in this case come within an exception to the clearly erroneous rule recognized in some courts when the trial court makes determinations solely on documentary evidence. Even if we recognize such an exception, it does not apply in this case. The opinion of the trial court, as well as the arguments of Gardner himself, make clear that resolution of this case turned at least partially on testimony given and exhibits displayed at trial. Accordingly, we apply the clearly

erroneous standard. Was the trial court clearly erroneous in its conviction that the proofs adduced at trial showed clearly and convincingly that the dimensional limitations of claim 1 made no significant difference in the operation of an air bar?

The salient evidence introduced at trial consists of the following:

1. The tests described in Gardner's affidavit submitted to the PTO during prosecution of the applications leading to the '447 patent. As may be recalled, these tests used a version of the dryer shown in Fig. 10 of Vits except that the nozzle width was different. The tests produced the following graph, showing the pressure profile of a Gardner air bar versus that of the Gardner version of the Vits dryer, as reproduced in Gardner's brief:



This graph shows quite clearly that at least the Gardner version of the Vits dryer produced negative pressure or suction (below zero line) at the edge of the web, whereas the curve associated with Gardner's air bar shows positive pressure to the web's edge.

2. Tests described by Gardner in his testimony at trial, and also in Plaintiff's Exhibit (PX) 31. These

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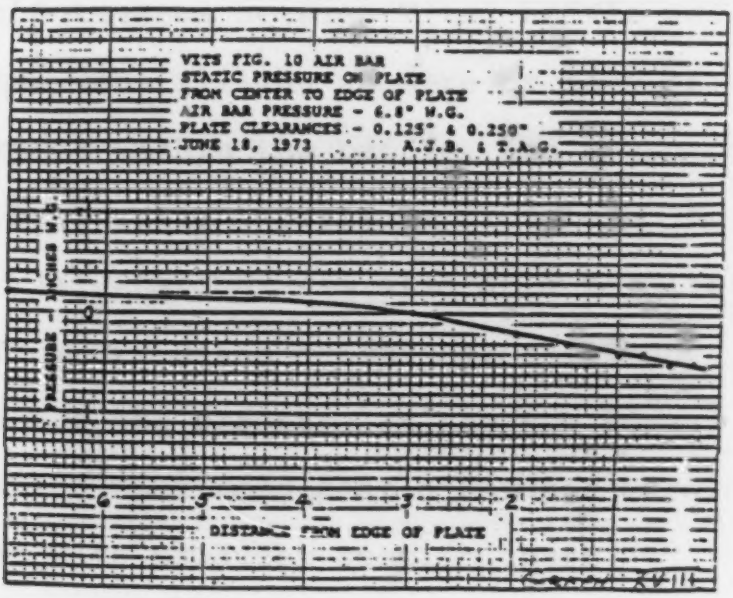
tests also used a Gardner version of a Vits dryer in which the nozzle width differs from that shown in Fig. 10. PX31 contains graphs such as the following:[3/]



which confirm the findings set forth in the PTO affidavit that at least the Gardner embodiment of Vits which was used produced suction at the web edges.

3/ This figure is a condensation of the exhibit, omitting one of two graphs.

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3. The so-called "wooden block" tests conducted by TEC's expert, Dr. Daane. In these tests, Dr. Daane also used a Gardner version of Vits. He then inserted wooden blocks of various thicknesses between Vits' baffle and the web, filling up more or less of the space within the baffle, and measured the resultant pressure profiles. At trial, Gardner was also able to elicit from Dr. Daane additional testimony about the pressure at the web edges, which confirmed that a Gardner version of Vits produces suction there.

What little the trial court said about the evidentiary bases for its holdings has for the most part already been mentioned above. The trial court opined that the tests reported to the PTO were "of little probative value" because of Gardner's deviation from the nozzle width depicted in Fig. 10. The

trial court said nothing about Gardner's PX31 tests and testimony, except for a catch-all statement that "The evidence at trial never showed that departing from [the dimensional limitations] would necessarily cause an air bar to function or fail." Finally, the trial court seemed to set great store by the evidence provided by Dr. Daane. As stated in its opinion (at finding 51):

> Dr. Daane conducted a series of experiments with a scaled model of a Vits bar (figure 10) using wooden inserts to vary the distance from the baffle plate to the surface of the web. These experiments, repeated during the trial, demonstrated clearly that a Vits embodiment developed both static and kinetic energy, that there was no difference in the type of static pressure under the Vits or the Gardner teachings, and that the Vits device worked entirely satisfactorily in "floating" a web. The pressure profiles differed somewhat depending on such factors as the pressure in the plenum (Sp.); the angle of [sic; at] which the jets struck the web; the size of the orifice and the relative closeness or remoteness of the web to the suppression plate or baffle plate.

However, the differences were in quantity, not kind, and might or might not be beneficial depending upon how important problems such as weight, strength, dryness, edge flutters, and support of the web were to one.

The trial court made additional relevant comments in the opinion on the denial of Gardner's post-trial motions:

> Tests done during trial of the bar embodying Gardner '447 claims and a bar embodying Vits claims convinced the Court that their performance was essentially the same -- and that they functioned under the same principles. This was particularly true when the tests utilizing a web and movable pressure gauge were performed by defendant with configurations, nozzle slots, and air pressures that made the tests probative. The wooden insert proved that for proper support, the nozzle slots did not have to be no closer to the web than the suppression plate; that the minimum spacing between the web and the plate did not have to be at least twice as great as the nozzle slot width; and that the product of the width of the plate and the spacing of the plate from the web did not have to necessarily be less than twenty times the nozzle slot width.

As to the Gardner claim that the

> maximum spacing of the plate from the web could never be greater than the width of the plate, to be sure the Court observed that there was a limit beyond which the plate could not be separated from the web. Otherwise the phenomena which cause air bars to function became inoperable. But there was no magic to the various dimensional limitations which the applicant included in Claim 1 and, therefore, they provided no help to the Court in ruling on non-obviousness.

Gardner attacks the trial court's denigration of his affidavit tests by pointing out that Vits does not specify any width for his nozzles, and that the trial court could not properly rely upon the scale of Vits' Fig. 10 to infer the proper dimensions. The fact is that Gardner changed the Fig. 10 nozzle dimensions in building his version of Vits' bar and it was for the trial court to evaluate the probative weight to assign to the tests which were made with it. We cannot find reversible error in the trial court's evaluation of that test evidence on a fact issue.

Having surveyed all of the above-mentioned evidence, a well as other evidence cited to us by the parties, we are not "left with the definite and firm conviction that a mistake has been committed." United States v. United States Gypsum Co., 333 U.S. 364, 395 (1948). It is indisputable from the record that a Gardner version of a Vits dryer produces some suction at the edge. It is equally indisputable, however, that pressure profiles are a complex function of nozzle size, nozzle direction, and plenum pressure, to name the few variables referred to by the trial court. Claim 1, however, is not limited to any of these variables. Thus, no unique pressure profile arises from the combination specified therein, and any advantage alleged to derive from the existence of such a pressure profile is eliminated from consideration. The

trial court would not have been clearly erroneous in concluding that the dimensional limitations did not specify a device which performed and operated any differently from the prior art. Its decision therefore stands.

We note further that Gardner also alleges reversible error in the trial court's failure to find that Gardner's air bar had been a commercial success. Suffice it to say that this issue was hotly disputed at trial, with conflicting evidence on amounts of sales and whether those sales were due to the inclusion of the claimed features of the invention. TEC even goes so far as to say that Gardner's air bars were such a spectacular failure that they poisoned the reputation of floater dryers. The trial court resolved these issues of credibility by finding, in effect, neither commercial success nor failure. Gardner

has failed to convince us of any clear error in its so doing.

Finally, to address Gardner's contentions regarding synergism, this court has sought to make it clear that an absence of "synergism" or "synergistic effect" has no place in evaluating other evidence of nonobviousness, for example as in Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1540, 218 USPQ 871, 880 (Fed. Cir. 1983). Here, however, as in Stratoflex, the trial court premised its holding of invalidity on proper grounds of obviousness, with which we agree, and at most alternatively on a lack of synergism. Thus, error in the trial court's reliance on a lack of synergism in this case is harmless. Id.

Gardner has not argued the validity of the remaining claims in suit, claims 3, 4, and 8, apart from the validity of

claim 1, from which they depend. We cannot discern for ourselves any independent basis for their validity. We therefore affirm the holding of invalidity of these claims as well.

CONCLUSION

For the foregoing reasons, the decision of the trial court that U.S. patent No. 3,452,447 is invalid is vacated as to claims 2, 5, 6, and 7 for reasons stated in note 1, supra, and affirmed as to claims 1, 3, 4, and 8.

MODIFIED

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

MEMORANDUM

RE: Appeal No. 83-697
Thomas A. Gardner vs.
TEC Systems, Inc., etc.,
et al.

The Court today announced its decision in the above-entitled appeal.

A copy of the Court's opinion is enclosed, and a judgment in conformity with the opinion has been entered today as required by Rule 36, Federal Rules of Appellate Procedure.

Costs may be recovered (by Appellant or Appellee) as provided by Rule 39, Federal Rules of Appellate Procedure.

Very truly yours,

George E. Hutchinson,
Clerk

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

THOMAS A. GARDNER, Appellant,	)	
v.	)	No. 83-697
TEC SYSTEMS, INC., ETC., Appellee.	)	

O R D E R

A suggestion for rehearing in banc having been filed in this case,

UPON CONSIDERATION THEREOF, it is Ordered by the court that the suggestion for rehearing in banc be, and the same is hereby, Declined.

FOR THE COURT

George E. Hutchinson
Clerk

February 22, 1984
Date

cc: Henry C. Fuller
James E. Nilles

UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF WISCONSIN

THOMAS A. GARDNER,

Plaintiff,

vs. Case No. 69-C-369

TEC SYSTEMS, INC.,
a Wisconsin corporation,
ROY E. DOWNHAM, JACK ECKELAERT
and JOHN W. FROST,

Defendants.

MEMORANDUM AND ORDER

Statement of the Case

Plaintiff filed this action on July 28, 1969, charging the defendants with infringement of two patents and unfair competition. One patent was U.S. Patent No. 3,172,412 for "Multiple Nozzle Air Blast Web Drying" which issued to plaintiff, Thomas A. Gardner, on April 6, 1965. Plaintiff subsequently withdrew this patent from suit and abandoned the charge of unfair competition.

The other patent in suit is U.S. Patent No. 3,452,447 for "Web Positioning Means and Method" which issued on July 1, 1969 to plaintiff. The claims relied upon by plaintiff in this action are Claims 1, 3, 4 and 8.

Plaintiff seeks injunctive relief and an accounting. Defendants deny validity and infringement of the patent in suit. Defendants further allege that the patent is unenforceable because of misconduct by the plaintiff before the Patent Office and the Court. Both parties seek awards of costs, expenses, and attorney's fees pursuant to 35 U.S.C. §285.

During the pendancy of the action, defendant, TEC Systems, Inc. and the individual defendants Downham, Eckelaert, and Frost moved to dismiss pursuant to Rule 41(b). By an order dated February 4, 1977, the Court denied the motion for dismissal as to the corporate de-

fendant TEC Systems, Inc., granted dismissal as to individual defendants Downham, Eckelaert, and Frost and ordered that the determination of whether costs, expenses and attorney's fees should be awarded be held in abeyance until the entry of judgment at the conclusion of the case. In this regard, the findings of fact made at that time are incorporated herein as paragraphs 15, 19, 20, 21, 22, 23, 24, 25, 26 and 27 of this document. Likewise, the conclusions of law made at that time are also incorporated herein.

Trial to the Court was held on January 19 to 23, 26 to 30, February 10 to 12 of 1976 and January 31, February 1, 4, 7, 11 and 14 to 17 of 1977. At the conclusion of trial, the Court requested proposed findings of fact, conclusions of law and post-trial briefs on pertinent issues as well as

a proposed form of judgment. The following constitutes the Court's Findings of Fact and Conclusions of Law pursuant to Rule 52(b) of the Federal Rules of Civil Procedure.

FINDINGS OF FACT

Parties and Background

1. Plaintiff Thomas A. Gardner is an individual citizen of the United States and resides at 513 Clark Street, Neenah, Wisconsin 54956.

2. Defendant TEC Systems, Inc. is a corporation of the State of Wisconsin. At the time of the filing of the complaint, it was located in Menasha, Wisconsin. Subsequently, it moved to DePere, Wisconsin. Its principal place of business is now located at 830 Prosper Road, DePere, Wisconsin 54115.

3. Defendant Roy E. Downham is an individual citizen of the United States.

At the time of filing of the complaint he resided at 457 East Lowell Place, Neenah, Wisconsin. He now resides at Fox Trail, Route 5, Green Bay, Wisconsin 54115.

4. Defendant Jack Eckelaert is an individual citizen of the United States. At the time of filing of the complaint he resided at 1043 Oak Street, Neenah, Wisconsin. He now resides at 706 North Winnebago, DePere, Wisconsin 54115.

5. Defendant John W. Frost is an individual citizen of the United States. At the time of filing of the complaint he resided at 512 East Parkway Boulevard, Appleton, Wisconsin. He now resides at Birch Creek Road, DePere, Wisconsin 54115.

6. Overly, Inc., a corporation of the State of Wisconsin, has its principal place of business at 211 Jackson Street, Neenah, Wisconsin 54956. Overly is not a party to this suit but is licensed

under the patent.

7. Plaintiff Gardner is a graduate mechanical engineer. He was employed by Abitibi Corp., a Canadian paper manufacturer from 1949 to 1953, and by Marathon Corp. (later American Can Company) until early 1963. His experience covered a broad field in the paper and related industries. During the latter portion of his time with Marathon he became a staff specialist in web drying and coating.

8. In 1954, while doing project work for Marathon, Gardner became acquainted with William Overly of Overly's, Inc. At that time, Overly's was a metal fabrication firm with 15 to 25 employees that manufactured drying equipment to serve primarily the paper industry. Gardner and Overly worked together on various projects and they discussed problems in the realm of air

drying.

9. Beginning in 1955 an arrangement developed between Gardner and Overly whereby with the approval of Marathon, Overly supported the development of some of Gardner's ideas, made prototypes in their shop and in return, were to receive a license for any successful device. The first device that was actually patented was an invention for Multiple Nozzle Air Blast Web Drying (U.S. Patent No. 3,176,412 PX 58).

10. The background of the events which occurred next requires an understanding of the art of process printing. Process printing involves the use of high gloss heat set inks on relatively non-ink absorbing high gloss coated paper. This type of printed matter is exemplified by the type of paper used in slick paper magazines such as Life, Time, National Geographic, etc. This

type of printing differs greatly from other types of printing, such as newspaper printing, in which an absorptive paper is used and the ink is absorbed in the paper and hence does not require drying of the ink. Process printing also differs from rotogravure printing in which highly volatile solvents are present in the ink. These evaporate very quickly so that the printed web does not require much drying. However, the heat set inks needed for the high gloss type of printing used in the process printing industry have ingredients including oil solvents with high boiling points, frequently in the neighborhood of 450°-600°F. Such inks are necessary for process printing because they will not dry out and cake up on the press. Accordingly, webs printed with such inks can be run at the high speeds on the offset and letter

presses typically used in the process printing industry. But, at the same time, inks with oil solvents having such high boiling points are very difficult to dry and require high temperatures to boil or evaporate off the solvents from the inks.

11. During the period we are concerned with here, the process printing industry had moved extensively into high gloss papers with heat set inks and utilized presses with ever-increasing speeds. But the oil solvents were impossible to dry at the temperatures previously used and drying techniques were concentrated on what were called flame and flame-air dryers. Various flame dryers are illustrated in PX 38.

But flames and flame-air dryers had a number of drawbacks. First, there is an adverse effect upon the paper of the web. The paper web inherently con-

tains a certain amount of moisture and when subjected to the temperatures of some of the dryers reaching as high as 1500°-2000"F., some of the moisture from the web itself is evaporated and the web becomes brittle and disclored. Second, such temperatures tend to soften the resins which are part of the heat-set ink. These softened resins sink into the paper and do not sit on the surface to hold the pigments. This results in a loss of gloss. Third, blistering of the paper web is a problem. The web acquires a bumpy or goose-pimpled effect. Fourth, a major problem is the ever present hazard of fire. Open-flame dryers directly expose the paper to the flames. If the paper moved too slowly or stopped moving, it could easily ignite and cause great danger in printing establishments with ever-present inflammable materials

around. Fifth, utilization of flame and flame-air dryers severely limited the speed and capacity of the presses. On a web printed on both sides, it is not possible to support the web mechanically before the ink is dry because the rollers or supports would smear the ink. Accordingly, the web had to be run slowly enough in the space between the printing roll and the first mechanical support to allow the flame or flame-air dryers to set the ink before the web reached the first mechanical support, but yet fast enough to avoid its catching on fire.

12. In an effort to address these problems, plaintiff in 1960 developed a high velocity air dryer expressed in Gardner 412-PX 58. This was not a floater dryer but a radial or platen-type dryer. It could effectively dry with high speed air a web printed on one side only. The other side of the

web was supported on a drum, or a flat or curved platen. This device, unlike the flame and flame-air dryers, could utilize a much lower temperature of the drying medium. With an air temperature of 500°-600°F., the web paper was not subject to temperatures so high as to blister or remove moisture from the web. Yet, the oils in the ink solvents could be removed very quickly because of the high mass transfer rate between the flowing air and the inked surface. The heat set ink retained its gloss and the resins would sit upon the coated surface and hold the pigments. Furthermore, the fire-hazard of the flame-type dryers was eliminated. Nonetheless, Gardner 412 was not a complete solution. To use this dryer, the web had to be printed on one side, that side dried, and then the web printed on the opposite side and that side dried.

13. Plaintiff's first attempt to use high velocity air drying on a web simultaneously printed on both sides took place at the Miehle Company of Chicago, Illinois, in 1962. This company was developing a new high speed press. Overly, under Gardner's direction, fabricated a new dryer which was sent on consignment to Miehle with the hope it would prove satisfactory. The dryer utilized no drum or platen, but rather consisted of sets of opposed high velocity nozzles with the web to be floated or transported between them, The effort was a failure. The web would not remain properly positioned between the nozzle and would stick to one or the other set of nozzles. Also, the web would drag on the nozzles and wipe the ink off on the nozzles. This would gum-up the nozzles and smear the paper.

14. Concluding that attempting to

support and dry a high-speed web, simply through the use of straightforward or dynamic jets, would not work, Gardner, in early 1963, cast about for a different approach and decided to use a static pressure area to support and stabilize the web. A program was initiated at Overly, Inc. under the cooperative arrangement between Gardner and Overly, and for a concentrated period of about twenty days in 1963, variations were fabricated each day and tested each night with a device that Gardner called a "Web Stabilizer Air Bar" ultimately being installed with a high-velocity dryer then being built and reconstructed to accommodate the new device (PX 43). The design still had certain problems but, within a month, a new dryer with web stabilizers was installed in a new offset press. Several more dryers of similar design were subsequently in-

stalled. The first sale by plaintiff and public use was at the McCall Corporation Printing Plant in Dayton, Ohio, in the spring of 1963.

15. Plaintiff Gardner authored several technical papers in 1963 and 1964 describing the Gardner air bar and dryers equipped with it. Overly, Inc. published reprints of these technical papers, as well as its own advertising literature and catalogs illustrating and describing the same. These publications include PX 39-46, inclusive.

16. Plaintiff initially filed an application for the patent in suit on September 23, 1963. After a long and tortured prosecution, the patent in suit (U.S. Patent No. 3,452,447, PX 1), entitled Web Positioning Means and Method, was granted on July 1, 1969.

17. Plaintiff Gardner is also the named inventor and owner of the following

foreign patents, the disclosures of which correspond to the patent in suit:

(a) Canadian Patent 745,041 issued October 25, 1966.

(b) British Patent 1,073,591 published June 28, 1967.

(c) French Patent 1,395,604 published March, 1965.

(d) Italian Patent 753,161 published March 1967.

An application was made for a German patent, but this application was rejected on a Carlisle Patent No. 3,097,971 (DX308) by the German Board of Appeals. Gardner did not appeal this determination but abandoned any further efforts to obtain a German patent. Overly, Inc. is not a party to this suit but it is licensed by Gardner under the U.S. patent in suit (U.S. Patent 3,542,447) and the foreign patents listed immediately above (PX 6). Beginning with the first manu-

facturing of Gardner air bars in 1963, Overly operated under a verbal license. Gardner left Overly's in 1967 and took his materials with him; but earnings under the licenses continued for several years. In January 1969, a written license was executed.

18. Pursuant to the license agreement, Gardner received the following royalties on 93 systems sold over an eight-year period:

1964	$30,000
1965	$50,000
1966	$36,000
1967	$62,000
1968	$56,000
1969	$70,000
1970	$10,000

Payments for 1969 and 1970 were made over a period of years. Gardner testified that there were no sales after 1970 because Overly, Inc. was no longer in the

market with high velocity floater dryers, TEC Systems, the defendant, having taken over the market by then.

Liability of Individual Defendants

19. From a time prior to 1963 and until January of 1969, individual defendants, Downham, Eckelaert and Frost were employed by Overly, Inc. in positions of trust and confidence. At the end of this period, Downham was executive vice president of Overly, Eckelaert was director of sales of Overly, and Frost was chief engineer of Overly. The defendants left the employ of Overly, Inc. in order to market a product which they had designed on their own time during 1967 and 1968.

20. Defendant TEC Systems, Inc. was incorporated on January 14, 1969 to manufacture and market the accused device. Each of the individual defendants: Downham, Eckelaert and Frost, owns approximately 26.5 percent of the shares

of stock of TEC, for a total of 79.5 percent thereof. The remainder of the stock of TEC Systems, Inc. is owned by a sma-l group of minority stockholders. At all times during the existence of TEC, defendant Downham has been president and chairman of the Board of Directors. Defendant Eckelaert has at all times been vice president and director. For a brief period after its incorporation, Eckelaert also served as treasurer of TEC. At all times since TEC's formation, defendant Frost has serted as its vice president and director. Shortly after its incorporation, he was elected secretary and treasurer of TEC. Although the individual defendants are officers and directors of TEC Systems, Inc., there is no indication that any one or all of the defendants so dominate the corporation such that it could be construed as a mere instrument of the defendants or their

alter ego or a sham corporation. TEC Systems, Inc. appears to be an ongoing and independent concern. There is no evidence with respect to the activities of the Board of Directors or of the control of the individual defendants other than as set out above.

21. Part of the business of Overly, Inc. from 1963 until 1969 was the manufacture and sale of the Gardner air bar and dryers incorporating said air bar licensed under Gardner patent in suit No. 3,452,447. The individual defendants, Downham, Eckelaert and Frost, were thoroughly familiar with such air bars and dryers and the business operations of Overly, Inc. in the manufacture and sale thereof.

22. Plaintiff Gardner had office space on the premises of Overly, Inc. until early 1967 and conferred frequently with the individual defendants,

Downham, Eckelaert and Frost, with respect to the Gardner air bar and dryers incorporating the Gardner air bar. Said individual defendants were familiar with the fact that patent applications were pending on the Gardner air bar, that Overly, Inc. was licensed thereunder and that Overly, Inc. was obligated to pay royalties thereunder.

Plaintiff Gardner authored several technical papers in 1963 and 1964 describing the Gardner air and dryers equipped therewith and Overly published reprints of these technical papers, as well as its own advertising literature and catalogs illustrating and describing the same. These publications include PX 39-46 inclusive. The individual defendants Downham, Eckelaert and Frost had access to and were familiar with these published documents.

23. During 1967 and 1968, for a

period of approximately two years prior to the termination of their employement with Overly, Inc. in January of 1969, the individual defendants, Downham, Eckelaert and Frost, in their respective capacities for the Overly concern, became aware of increasing complaints from customers regarding performance problems with the Overly air bar and air flotation drying systems. Feeling that Gardner resisted efforts to alter and improve the device to meet the industry's needs, the three men worked together during this period on the development of a different air bar and an air flotation drying system incorporating such air bar. At least one of the individual defendants sought to conduct research and development at Overly, Inc. in order to improve the Gardner air bar but was rebuffed. In late 1968, said defendants made eight (8) such air bars and assembled

them in a plywood and sheet metal mockup of a dryer. This mockup and one of the said air bars is illustrated in defendant TEC's advertising brochure, marked Plaintiff's trial Exhibit 14 (Plaintiff's Deposition Exhibit 1 referred to in the depositions of Downham and Eckelaert of August 28, 1969). This brochure was publicly distributed prior to this suit. Prior to this suit, defendants solicited sales of its accused air bars and dryers incorporating such air bars on the basis of the apparatus shown in the brochure, and a demonstration model thereof which is similar to the demonstration model (PX 47) and the brochure. Defendant TEC received its first order for such a dryer in April of 1969. TEC delivered its first dryer to a customer in September, 1969.

24. On February 27, 1969, individual defendants, Downham, Eckelaert

and Frost, filed United States Patent Application Serial No. 802,923 on the subject matter of their air bar and air flotation system. This application was assigned to defendant TEC and ultimately matured into United States Patent 3,549,070 on December 22, 1970. Subsequently, defendant TEC has obtained United States Patent 3,739,491, granted June 19, 1973; Patent 3,776,440, granted December 4, 1973; Patent 3,873,013, granted March 25, 1975, on the subject matter relating to this suit.

25. Corporate defendant TEC has issued various publications relating to subject matter accused as infringing the patent in suit. These publications include exhibits (PX 13-28).

26. During the two-year period in 1967 and 1968 when the individual defendants were developing an air bar, they maintained a record of their work which

is identified as defendant's loose leaf book, or "black book," (PX 29). This record, while not all inclusive, indicates that the defendants conducted extensive tests and expended a considerable amount of time and effort in the development of the accused device. While the accused device may, in fact, infringe the patent in suit, the evidence indicates that the individual defendants believes that they had developed a "non-infringing" device. Because of its determination of other issues, the Court need not resolve infringement.

27. No accused air bars were delivered to customers by defendants prior to filing of the complaint in this action.

28. The facts as set forth above distinguish this case from those wherein the individual defendants pirate or copy the design of the patent in suit and then actively induce the subsequent manu-

facture and sale of the accused device. The extensive experimental activities of the individual defendants were, in the opinion of this Court, conducted in good faith in order to develop an improved air bar. The Court is persuaded that the defendants believed that the accused device was noninfringing because of the improved features incorporated therein. The commercial success of the accused device is further evidence of the improved design of the TEC air bar. In the final analysis, the plaintiff has failed to establish that the individual defendants merely copied the Gardner patent and then actively induced the subsequent manufacture and sale of an infringing device.

29. The facts also fail to establish that TEC Systems, Inc. is the mere "alter ego" of the individual defendants. While the plaintiff has es-

tablished some of the criteria for such a finding, the Court is not persuaded that the plaintiff has met his burden of proof. As such, this case is not unlike that of Besly-Welles Corp. v. Balax, Inc., 291 F. Supp. 328 (E.D. Wis. 1968), affirmed in part, reversed in part on other grounds, 421 F.2d 809 (7th Cir. 1970), cert. denied, 399 U.S. 911. In that case, the individual defendant had designed the accused device, was president of the corporation, and owned sixty-three percent of the common stock. Judge Gordon found that there was no indication that the corporation was the mere instrument of the defendant even though the defendant had owned all of the stock at one time. He alluded to the fact that the board of directors was apparently active in the management of the business affairs of the corporation. In the instant case, none of the individual de-

fendants owns more than 26.5 percent of the shares of the corporation. While the individuals are officers and directors of the corporation, there is no proof that the corporation is a sham. The evidence indicates that the corporation is an ongoing and independent concern. There is a total absence of proof on the activities of the Board of Directors or even the number and identity of the directors other than the individual defendants. The evidence indicates that there are minority shareholders. In sum, the Court is persuaded that the plaintiff has failed to make the special showing necessary to pierce the corporate veil.

30. The Court is further persuaded that plaintiff's proof fails to establish that the individual defendants as officers of the corporation acted willfully and knowingly with the intent to infringe the patent in suit. While it is conceded

that the defendants sought to compete with the Gardner air bar, the evidence indicates that their activities were conducted in good faith in the belief that they had designed a noninfringing device.

The Patent and Its Prosecution

31. The patent in suit (U.S. Patent 3,452,447 - Ex 1) is entitled "Web Positioning Means and Method." The Abstract of Disclosure indicates:

ABSTRACT OF THE DISCLOSURE

> For positioning a moving web either in space or against a heat exchange surface, a zone of superatmospheric pressure is established by disposing a suppression plate as close to the face of the web as is mechanically practicable and then directing between the web and plate obliquely in opposition to each other elongated jets of gas which are continuous across the web. The resultant reaction pressure develops as the gas is turned back upon itself at the edge of the pressurized zone to flow in opposite direction longitudinally of the web.

Despite its title, the patent claims

only apparatus since all of the plaintiff's method claims were ultimately rejected by the Patent Office. That decision was sustained on appeal to the Patent Office Board of Appeals and also on petition for reconsideration.

This suit involves Claims 1, 3, 4, and 8 of the patent which are the subject matter allegedly infringed. Claims 3, 4, and 8 are dependent on Claim 1 and incorporate all of the elements of Claim 1 into each of them.

32. Claim 1 of the patent, broken into its constituent elements, is:

> Means for positioning a moving web by subjecting a transverse zone spanning the web to uniform static pressure, said positioning means comprising
>
> a suppression plate extending transversely across said web and spaced therefrom as closely as is mechanically practicable,
>
> nozzle means no closer to the web than said plate and having slots which extend substantially continuously across said web and are

spaced at opposite sides of said plate,

the minimum spacing between the web and said plate being a distance at least approximately twice as great as the nozzle slot width,

the maximum spacing of the plate from the web never being greater than the width of the plate, the product of the width of the plate and the spacing of the plate from the web being less than twenty times the nozzle slot width,

and means for discharging gas under pressure through the nozzle slots for defining a zone of static pressure between the plate and the web.

Claim 3 also incorporates all of the subject matter of Claim 1 and adds to them two more requirements as follows:

both the plate and the nozzle slots extend laterally beyond the side margins of the web,

escape of gas laterally of the web holding the web margins laterally tensioned and flat.

Claim 4 likewise incorporates all of the subject matter of Claim 1 and adds two other requirements as follows:

the nozzle slots are so positioned angularly as to direct opposing jets of gas convergingly toward the web and into the space between the web and the plate,

such space providing clearance for change in direction of the gas of said jets to move in opposite directions from a zone of static superatmospheric pressure established by the jets between the plate and the web.

Claim 8 incorporates all of the subject matter of Claim 1 plus the following three requirements:

air bars offset longitudinally of the web,

each bar comprising positioning structure as defined in Claim 1,

the offset of said bars being sufficient to effect deflection of the web in passing the bars successively.

33. Thus, it will be seen that subject matter of Gardner 447 (PX 1) is claimed in Claim 1 as a combination of: (1) a moving web; plus (2) a "suppression plate extending transversely across said web and spaced

therefrom as close as is mechanically practicable"; plus (3) nozzle slots "which extend substantially continuously across said web and are spaced at opposite sides of the plate"; plus (4) "a means for discharging gas under pressure through the nozzle slots"; plus (5) results from the foregoing in terms of "a zone of static pressure"; plus (6) three sets of dimensions which allegedly define both the minimum and maximum distances between the plate and the web and a maximum result for the product of the width of the suppression plate times the space between the web and the suppression plate.

The three sets of dimensions are:

(a) The minimum spacing between the web and the plate is a distance at least approximately twice as great as the nozzle slot width.

(b) The maximum spacing of the

plate from the web is never greater than the width of the plate.

(c) The product of the width of the plate and the spacing of the plate from the web is less than 20 times the nozzle width.

34. The patent in suit teaches:

> . . . directing between the web and plate obliquely in opposition to each other elongated jets of gas which are continuous across the web. The resultant reaction pressure develops as the gas is turned back upon itself at the edge of the pressurized zone the flow in the (sic) opposite direction longitudionally of the web. Gardner 447 Abstract of Disclosure.

Hence, the claims create the cushion to support and carry the web by utilizing opposed directional jets which collide with the underside of the web and each other such that the gas then is forced back upon itself and finds relief only in the flow out laterally through the ends of the bar.

35. The patent application herein

had a long history requiring three successive applications extending over a period of about six years before the patent was ultimately approved. The initial application for the patent in suit was filed on September 23, 1963. The claims were broadly couched and all those claims involved in this suit were rejected based on U.S. Patent No. 3,181,250 (Vits DX 300).

36. Amended claims were submitted on April 18, 1966. Again, the relevant claims were rejected based on Vits, the examiner disagreeing with Gardner that the Vits did not teach static super-atmospheric pressure. This was a final rejection. (DX 300).

37. In an attempt to persuade the examiner to change his mind, on June 6, 1966, the plaintiff filed a new amendment and a lengthy affidavit in which

he submitted the results of tests which he had performed on an embodiment of the Vits bar which he had constructed from Figure 10 of the Vits patent. His affidavit recited that the Vits embodiment was scaled as nearly as possible identical with the showing of Figure 10, except that it was necessary to reduce the width of the nozzle slots so that the amount of air used would be at least reasonably comparable with the amount of air used in the Gardner nozzle. Throughout the affidavit the thesis of the petitioner was that the Vits device depended upon impingement pressure and did not function through the utilization of static pressure. He compared the results which he had obtained from the so-called Vits embodiment and the so-called standard commercial product embodying the Gardner claims and cited the tests as "conclusive evidence that

Vits was not concerned with the static pressure of the type produced by a suppression plate."

38. At the trial, defendants strenuously alleged that the embodiment of Vits used by Gardner in his comparative tests and analysis was in no sense a faithful reproduction of the Vits device or the Vits teachings. Plaintiff acknowledged in his affidavits to the patent office that the width of the nozzle slots was reduced so that he "would be able to use an amount of air at least reasonably comparable with the amount of air used in my nozzle." In the embodiment used for these tests, the Vits model slots were .030 inches. The Court opines that this represents a substantial departure from the scale of Figure 10 of Vits 250 and renders the comparative performance tests with the Gardner embodiment of little probative

value.

Despite Gardner's contentions that, on the basis of the test described in his affidavit, the Vits teachings did not involve a zone of static pressure, the examiner continued to reject the application although he did indicate that the affidavit would be entered in the file wrapper. (DX 300, p. 70).

39. There followed additional interviews with the examiner and then the plaintiff refiled, as a continuation application, serial number 570,671, on August 5, 1966, Claims 1 through 19 and abandoned the original application. These claims were again finally rejected by the patent office. (DX 300, p. 87).

40. This activity led to the filing of yet another amendment and substantial argument in support thereof on April 26, 1967. However, the

examiner refused to accept this amendment on May 18, 1967, and there followed application to the Board of Appeals from the examiner's decision. (DX 300, p. 102.) It is to be noted that in this unentered amendment the plaintiff recited that the Canadian Patent Office had allowed him a patent on the same subject matter and that, in connection therewith, consideration had been given to U.S. Patent 3,097,971, issued to Carlisle. Mr. Gardner further stated that the Carlisle patent did not show a suppression plate. Defendants point this out and contrast it with the plaintiff's action in not mentioning that the German Patent Office had refused, in defendant's exhibit 354, to issue a patent on the same subject matter because the examiner found that Carlisle did, in fact, teach everything that the plaintiff's claims disclosed. Thereafter, there were no further refer-

ences to Carlisle in the file wrapper and it was not listed by the examiner in the file wrapper as a reference he considered.

41. On May 25, 1967, plaintiff filed a third application as a continuation application and, in view of this effort, by letter dated June 16, 1967, abandoned the appeal of serail number 570,671. In the letter of transmittal, it was noted that the claims were "amended to make them very specific." The claims were amended to include a series of dimension ranges for the size of the nozzles, the "suppression plate," and the distance between the "suppression plate" and the web. (DX 300, p. 109.)

42. The Examiner finally rejected this third application (second continuation application), holding that the dimensions are within the skill of one ordinarily skilled in the art and not

unobvious. (DX 300, p. 116.) Plaintiff then asked for reconsideration in the light of his extensive affidavit in which he took a very strong position that the zone of superatmospheric pressure or static pressure described in his application was one in which there was "no flow of air through or into or paralleling the zone of static pressure. He argued that such a condition was not a teaching of Vits; that "it is true that the (Vits) says that static pressure is created in these cavities, but anyone with any experience in the flow of gases will realize that Vits must be using the term 'static pressure' in a sense entirely different from conventional usage. Actually, eddy currents in the spaces 15 will be unavoidable in the Vits device."

43. Apparently believing that Vits taught a static pressure with some fluid flow and turbulence, the Examiner re-

moved his previous rejection and held that Claims 1 and 8 were now considered allowable. (DX 300, p. 147.)

44. The Patent Office Board of Appeals thereafter affirmed the Examiner's earlier rejection of the process claims. The plaintiff petitioned for a rehearing and the Board thereafter adhered to its position. The ultimate allowance of the apparatus claims 1 to 8 by the Examiner brought an end to a very long (nearly six years) process of vigorous prosecution of the claims in the Patent Office.

The Accused Devices

45. On February 27, 1969, defendants Downham, Eckelaert and Frost filed United States patent application Serial No. 802,923, which was thereafter assigned to defendant TEC Systems, Inc. and matured into U.S. Patent No. 3,549,070. (DX 311, Fig. 8) on December 22, 1970. It is noted that the application date of TEC

070 was a little over four months prior to the date of issuance of the patent in suit which finally issued on July 1, 1969. Throughout the trial this accused device was referred to as a "TEC Standard Air Bar."

46. A subsequent application by Mr. Stibbe, a TEC employee, resulted in U.S. Patent No. 3,873,013 (DX 312), the physical embodiment of which is known as the TEC Hi-Float Bar.

47. Defendant TEC Systems manufactures and sells flotation dryer assemblies to its industrial customers. These assemblies are to support and dry webs of paper or similar materials which are processed through the bars after high speed printing. The air bars extend transversely across the dryer flotation assembly on opposite sides of the path of the web. In operation, these air bars direct jets of air to impinge

against the web to help float and dry the web and to create a dynamic cushion of static pressure with turbulent air therein having eddy currents and kinetic energy on which the web is also supported.

48. Both varieties of defendant's air bars employ structures that they referred to as Coanda bars. These relate to jets of air or gas under pressure expelled adjacent to a curved or rolled surface wherein the gas jet displays a tendency to follow the curved surface. The bars each have a pair of slot-shaped Coanda nozzle orifices, one along each side of the Coanda plate and recessed from the exterior of the plate. Air under pressure inside the bar is expelled through the two Coanda nozzle slot orifices, and when no web is present, the jets of fluid air follow the curved surface of the Coanda plate to collide with each other.

When a web is introduced in close proximity to the Coanda plate, the flow of pressurized air into the space between the plate and the web builds up a cushion of air under super atmospheric pressure. This cushion overcomes a great proportion of the Coanda effect so that the jets of pressurized air as they round the curved edge of the bar are peeled off the surface and forced into direct right angle impingement against the surface of the web. The jets combine with the cushion of pressurized air to provide substantial support and drying capability to the web.

49. In the so-called "TEC Standard Air Bar" (DX 311), air is injected into the pressure zone between the Coanda plate, the web, and the two slots through a center row of holes mid-way of the width of the plate. This string of jets also impinges against the web for support and drying utilization.

50. In the so-called "TEC Hi-Float Bar" (DX 312), the structure is the same but air is exhausted or withdrawn through the center row of holes from the cushion zone between the web, the Coanda plate, and the two parallel slot orifices and expelled to the atmosphere.

51. To support and dry the webs, the dryer flotation assemblies manufactured by TEC Systems employ a series of air bars which extend transversely across the dryer flotation assembly on opposite sides of the path of the web. The bars on one side of the web are staggered or offset from the bars on the other side of the web to utilize a sine wave pattern in the web. Installations of both Gardner bars and TEC bars used this sine wave device to tension the web, reduce edge flutter, and maintain the tautness of a web subjected to a variety of disturbing in-

fluences.

52. One of the issues at trial was whether the spacing between the web and the suppression plates of the accused bars exceeds double the nozzle width so as to infringe on the limitation of Claim 1 of the Gardner patent that the "minimum spacing between the web and said plate being a distance at least approximately twice as great as the nozzle slot width." TEC witnesses testified that those bars having slot orifices 0.060 inch wide should be operated so that opposed bars are 1/8 (0.125) inch or less aparat (1/16 inch or less from the web); and that those bars having slot orifices 0.075 inch wide be operated so that opposed bars are 1/2 (0.50) inch or less apart (1/8 inch or less from the web). Plaintiff points to evidence that the floater dryers manufactured by TEC are provided with a mechanism by

which the final position of the two banks of opposed bars can be very easily adjusted by simple jack screws. Plaintiff contends that, while the specifications and original spacing of the TEC devices might be less than the patent limitation, the machines were invariably adjusted at installation so that they operated beyond twice the nozzle slot width and, that it is no defense to a suit such as this against the manufacturer that the accused device was not intended by the manufacturer to be used in a manner contemplated by the patent, if, in fact, it is reasonably capable of use in that manner. Kearney & Trecker Corp. v. Giddings & Lewis, Inc., 306 F. Supp. 189 (E.D. Wis. 1969). This issue, as it bears on "anticipation," need not be resolved by the Court since other issues are dispositive of the case.

53. The Court is persuaded and finds that, prior to the appearance on the market of the accused devices, the high speed printing industry had become extremely skeptical of floater dryers. This dissatisfaction arose out of operating difficulties and resulted in a shift to the utilization of flame dryers. During this period, the Ben Offen Company was making the greatest number of sales with flame air dryers. With the advent of TEC bars in 1969, a resurgence of floater dryers occurred.

54. There are unique features inherent in the TEC air bars which exist largely because of the utilization of the Coanda effect to provide support for the web and drying capabilities:
(1) the jets of air issuing from the nozzle slots in TEC devices impinge in a direct right angle fashion on the web which results in a high heat transfer

rate conducive to rapid drying; (2) the presence of the "wall attachment phenomena" preserves the integrity of the jet; (3) since the nozzle slots are depressed from the plate and thus farther from the web, the slot cannot be touched by the web very readily and so will not become dirty or plugged easily; (4) the configuration of the nozzle is easier to manufacture while at the same time it is possible to maintain close tolerances of the slot widths in order to achieve uniformity of drying and web support; (5) choke-off of the jet is prevented because the jet issues from a slot nozzle located relatively far from the Coanda surface.

55. The TEC bars frankly utilize direct impingement of the jets for about 20 percent of the web support. The claims of the patent do not utilize jet impingement but depend almost exclusively

upon the zone of superatmospheric pressure induced between the jets.

56. Utilization of direct jet impingement and the turbulence within the zone of superatmospheric pressure in the TEC bars inherently provides greater drying capabilities.

57. The combination of a Coanda nozzle and a center row of holes for either greater pressure and more direct jet impingement or exhaustion permits great control and flexibility so that the peel-off point can be adjusted to a variety of conditions.

VALIDITY

58. Section 102 of Title 35 U.S.C. is entitled "Conditions for patentability; novelty and loss of right to a patent" and in pertinent part declares that "a person shall be entitled to a patent unless (a) the invention was. . . patented or described in a printed publi-

cation in this or a foreign country before the invention thereof by the applicant for patent . . . ."

Section 103 is entitled "Conditions for patentability; nonobvious subject matter" and provides that ". . . a patent may not be obtained though the invention is not identically disclosed or described as set forth in Sec. 102 of this title, if the difference between the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art of which said subject matter pertains."

59. As related to the case at bar, section 102 encompasses the issue of anticipation and section 103 the issue of non-obviousness. The Court has previously opined that the TEC devices may have infringed the claims of the Gardner '447 and has aluded briefly to the question

of anticipation of the claims. However, it is the Court's belief that this case is resolved on the question of non-obviousness, and hence no resolution of infringement or anticipation need be made.

60. It is axiomatic that to pursue intelligent inquiry on the issue of non-obviousness, we must determine what the "invention" of the patent is and what "the subject matter . . . patented is. The invention is delineated by the claims of the patent at issue--in this case Claims 1, 3, 4, and 8 of Gardner '447. These are the invention which measured by the claims, must be laid alongside the prior art of whatever form it is, whether writings, patents, or actual embodiments of ideas to ascertain whether the subject matter when (1) taken as a whole; (2) is non-obvious; (3) to a person having ordinary skill in the art;

(4) at the time the invention was made. 2 A. Deller, Walker on Patents §106 at 71. To make this analysis, the Court, having determined when the invention was made and what the level of ordinary skill in the prior art was, must then decide what differences, if any, exist between the applicable prior art and the claims in issue and whether or not the secondary factors described in Graham v. John Deere Co., 383 U.S. 1 (1966), are present.

TIME OF THE INVENTION

61. This factor is susceptible of rather precise determinations because the work which plaintiff did that ultimately resulted in the claims in issue from Gardner '447 all took place during an intensive period in 1963 of about twenty days. (PX 43); Gardner Tr. 150. During this period, variable devices to attack the problems of web support and drying capability were fabricated during the

day in the Overly shops and tested at night.

THE SUBJECT MATTER

62. The "inventions" being considered by the Court are the totality of Claims 1, 3, 4 and 8 of Gardner '447. The individual mechanical elements of the patent in suit are all old. Thus, the claims represent a combination of old elements. To be patentable such a combination must produce a synergistic result, that is, produce a greater result than the sum of the parts. Andersons-Black Rock v. Pavement Co., 396 U.S. 57 (1969).

LEVEL OF ORDINARY SKILL IN THE ART AT THE TIME THE ALLEGED INVENTION WAS MADE

63. The improvement of human life is a building process with each step upward in technology and science occurring when an individual takes as a foundation

the accumulated widsom of our forebearers and constructs thereon some improvement or invention containing the spark of inventive genius. Under appropriate circumstances and upon application, such a contributor is rewarded under our Constitution with a patent monopoly. But, 35 U.S.C. §103 requires that for such to be granted, the invention must not have been obvious to a person having ordinary skill in the art at the time.

This is a yardstick that is not particularly easy of application. The Court endeavors to assess the education, experience, and skill of those active in a field of endeavor at the time in question and then by injecting itself into the place of such persons at the time in question, determine whether the particular invention would have been obvious or non-obvious to such persons working in

the art to which the subject matter pertains, Malsbury Manufacturing Co. v. Ald, Inc., 447 F.2d 809, 811 (7th Cir. 1971). At trial here, each side produced witnesses skilled in the art involved; that is the utilization of fluid principles and mechanics to support and treat webs of flexible material without rollers or similar devices, as such art existed in 1963.

64. Most of the participants in the efforts which produced both the Gardner air bar and the Tec Standard and Tec Hi-Float bars, as well as the witnesses in the trial were all engineers, sophisticated in fluid dynamics and hydraulics. Some were directors of research efforts or of engineering staffs. Exceptions to this generalized statement would be William Overly, who testified essentially as a manufacturer and covered the period of the development of the

Gardner air bar and the licensing activities thereafter; and Thomas O. Kloehn, who was a patent attorney and an engineer although he had done patent work on paper making machines and printing machines. His testimony related to interpreting the intricacies of the file wrapper and explaining the rather extraordinary prosecution history of the patent in suit and procedures by the Patent Office.

65. Witnesses Downham, Forst, Gardner, Bachus, Dezalick, Eckelaert, Stibbe, and Daane were all engineers with an extremely high skill in the art. Hence, those skilled in the trade were engineers, designers, and researchers who were in the business of creating devices to meet the production needs of the paper, process printing, and metal treating industries. Those with ordinary skill in the art would, therefore,

typically be graduate engineers with a number of years of experience visualizing, designing, fabricating and testing web handling and treating equipment.

SCOPE AND CONTENT OF PRIOR ART

66. In the first office action on plaintiff's application, Serial No. 310,531, the Patent Office referred to the following prior patents:

No.	Patentee
602,799	Burns
2,654,159	Braebaek
2,928,185	Drew
3,181,250	Vits
3,216,129	Jepson

67. Burns was a basis for rejecting Claim 14 which is not at issue in the case at bar. Drew was cited "to show a rotatable drum carrying paper stock in combination with a plurality of adjustable conduits which jet air onto the paper." Subsequently, in application 641,384, Drew was cited as prior

art by the Examiner in rejecting Claim 2. Braebaek was cited "to show a drying zone through which the material to be treated is passed, said zone comprising a long narrow slit, but sufficiently narrow that turbulent air currents are avoided adjacent the plane of the treated material." Neither of these citations are relevant to the claims here.

68. The jepson patent was cited "to show an invention controlling the position of the material being treated by utilization of static pressure at the two sides of the material. In his remarks attached to amendments to his second application, Serial No. 570,671, dated February 15, 1967, plaintiff agreed with respect to Jepson that it disclosed the positioning of material between opposing nozzles, but argued that using opposing nozzles to position material was an old concept -- and that was not what his application

claimed. With a dismissal of Jepson as irrelevant, this particular prior art seems to have been ignored by the parties thereafter, both in the patent prosecution and at trial.

69. The Carlisle patent, No. 3,097,971 (DX 308), was not mentioned nor cited by the Patent Office examiner in the history of the prosecution of the patent in suit. The only mention of it appears in the "remarks" portion of the amendment which plaintiff submitted after final rejection of the second application (Serial No. 570,671). Defendants contend that inasmuch as the amendatory papers were untimely, the papers could be refused entry and consideration -- and that, hence, it must be presumed that the examiner did not consider Carlisle. Defendant further opines that, even if the Examiner did review the untimely amendment, he would have been

dissuaded from considering Carlisle '971 because plaintiff did not provide a copy and made various misrepresentations to the Examiner.

The import of this is that defendant contends that the facts in evidence here do not support an inference that the Examiner considered Carlisle and consequently plaintiff's patent in suit is not entitled to a presumption of validity as to Carlisle.

70. Hence, the cited and considered prior art which is relevant to the Claims 1, 3, 4 and 8, which were among those ultimately allowed and which are the only ones involved in this case, narrows down to Vits '250 and possibly Carlisle '971.

If the Court accepts defendant's contentions regarding Carlisle, the uncited prior art which the Court considers relevant and which emerged at trial consists of:

No.	Patentee	Exhibit No.
3,097,971	Carlisle	DX 308
RE 24,144	Dungler	DX 306
3,041,739	Meier-Windhorst	DX 307

A British Iron & Steel Research Association article (Jan., 1967) entitled "The Hover Pulley." (DX 321)

A British Article reprinted from the Journal of the Iron and Steel Institute by W. G. Jaffrey and Genefer M. Boxall, entitled "The Support of Thin Steel Strip on Air Cushions." (May 1963). (DX 321)

Having surveyed this prior art, both cited and uncited but noticed by the defendant under 35 U.S.C. §282 in the light of the exposition of fluid flow which the numerous exhibits and demonstrations developed the Court opines that Vits '250, Carlisle '971, and the two British Trade Journal articles are all important on the question of boviousness with Meier-Windhorst '739 and Dungler '144 of considerably lesser value.

VITS '250

71. By far the most pertinent prior art which must be considered by the Court is the Vits patent, No. 3,181,250 (DX 304). This is because the essence of the claims -- as plaintiff himself proclaimed time and again at trial, is the utilization of a zone of static pressure to support and dry the web. Throughout the testimony, the term "static" was used to describe an pressure that was stable, ambient, not changing, and relatively uniform as contrasted to "velocity" or "dynamic" pressure which described pressure related to forces that were unstable, changing, and constantly variable. In demonstrations of his principle, plaintiff satisfied the Court that the primary reason that a web is "floated" by a Gardner air bar is the existence of an area of superatmospheric pressure which is created transversely

across the web between the nozzle slots and between the web and the "suppression plate." The issue of the case was whether or not the prior art taught this utilization of superatmospheric pressure to "float" a web and the other components of the claims.

72. Vits '250 was filed September 21, 1961, and is entitled "Apparatus and Method of Drying Web Material by Directing Hollow Gas Jet Streams Against Opposite Faces of the Web." The patent is rather lengthy and makes some thirteen claims. The applicant was clearly addressing his theories to a variety of webs being treated under a variety of conditions. There are a number of figures illustrating various embodiments of the claims, of which Figure 10 most closely approximates the plaintiff's embodiment of the claims of Gardner '447. A great deal of illuminative language

appears in the Abstract of Disclosure.

After describing the various problems technicians were having in floating and drying high speed webs, Vits said:

> The method . . . is characterized in that the material is exposed to the influence of blower jets arranged at least in rows transverse to the direction of feed and having edge flows directed towards each other, said edge flows confining spaces tapered in the direction towards the web, in which a static excess pressure is generated and web-carrying air cushions are formed.
>
> This method, arrived at after numerous experiements and tests, solves the problem on hand because the space confined by the blower jets in such a way as to form the hollow jets is primarily filled with treating medium entirely at rest. It is thus capable of taking up the edge flow deflected at the web whereby a static excess pressure relative to adjacent flows is formed. Media such as air being under static excess pressure within a confined space will cause the formation of some sort of cushion. Vits '250 (DX 304) Column 2, lines 55-71. (emphasis added.)

Thus it clearly appears that in 1961, Hilmar Vits was not only teaching the

use of a cushion of excess static pressure to float a dry air cushion, but was also teaching that the zone of excess static pressure w-s occupied by a medium "entirely at rest." To the Court this sounds like exactly the concept that Gardner argued so vigorously to the examiner on page 12a of his original brief and in asking for reconsideration of rejection of his third application, i.e., that the zone was one in which there was "no flow of air through or into or parallelling the zone of status pressure."

Claim 1

73. The Vits Abstract sets forth at column 3, lines 3-28, Vits' explanation for the progressivity and elasticity that produce the equilibrium which is the means of positioning the web called for in the first element of plaintiff's Claim 1.

74. The "suppression plate" of plaintiff's Claim 1 appears to the Court o be what Vits calls a deflector 44 in figure 10 of Vits '250 as described in column 9, line 38. Its function is identical and plaintiff's requirements that it be spaced from the web "as closely as is mechanically practicable," the Court views as a limitation without a function. Progressivity is a function of how close the plate is to the web, and that location must be decided taking into consideration other factors such as volume of air flow, the weight of the web space needed for sine wave positioning, the lateral air flow needed to control edge flutter, and so forth.

75. In examining the prior art of Vits in conjunction with the elements of Claim 1 of Gardner '447, and having observed the numerous experiments and demonstrations at trial, the Court

concludes that the last element of Claim 1. A means for discharging gas under pressure through the nozzle slots for defining a zone of static pressure between the plate and the web, is clearly taught by Vits. The Court further concludes that the balance of the elements of plaintiff's Claim 1 represent limitations that do not really differentiate Gardner '447 from the Vits teachings and do not affect the utilization of the principles of fluid dynamics taught by Vits. Vits taught placing the slots on opposite sides of the plate or deflector and had said slots extending continuously across the web. Vits taught a means for discharging gas under pressure through nozzle slots so as to define a zone of static pressure between the web and the plate. The other two elements of Claim 1 of Gardner '447, "the minimum spacing

between the web and said plate being a distance at least approximately twice as great as the nozzle slot width" and "the maximum spacing of the plate from the web never being greater than the width of the plate, the product of the width of the place and the spacing of the plate from the web being less than twenty times the nozzle slot width," the Court views as artificial dimensional limitations that add nothing to the claims, that are of no constructive significance, and are essentially meaningless. The evidence at trial never showed that departing from these formulae would necessarily cause an air bar to function or fail. In other words, these claims are irrelevant.

Claim 3

76. The two elements which Claim 3 adds to those of Claim 1 are: "both the plate and the nozzle slots extend

laterally beyond the side margins of the web" and "escape of gas laterally of the web holding the web margins laterally tensioned and flat."

Both of these are clearly taught in Vits.

Figure 7 of Vits (DX 304) shoes the web being narrow or the nozzles being wider than the web width. Expert Daane testified that he had never seen a situation where a web was conveyed by a device which did not extend beyond the extremities of the width of the web. (Daane Trans. p. 2029).

Vits '250 in column 3, lines 44-52 addresses escape of gas laterally of the web:

> The build-up spaces proper need not be closed off at the faces by additional jets, as the reactions of the solid walls of the drier, confining the treatment space along the edges of the web on the course of the flow of the medium are already felt here. Moreover, the face area of the build-up spaces

is small in relation to the large build-up areas extending over the entire width of the web, especially when arranged diagonally relative to its direction of feed.

It deals with both lateral escape and problems of edge flutter in column 5, lines 1-11:

> The build-up space terminates at the edges of the web and is open at the side so that the excess pressure escapes within the area of the web edges in a direction transverse to the direction of web feed, producing a cross flow away from the web edge that might give rise to fluttering movements of the web edges. This fluttering would normally be promoted by the flow-off between rows of nozzles extending in parallel. For keeping the edge at rest, it is suitable to minimize the cross flow in the area of the edge as far as possible or to baffle it.

Claim 4

77. Claim 4 of the patent in suit likewise incorporates all of the subject matter of Claim 1 and adds two other requirements: (1) "the nozzle slots are so positioned angularly as to direct opposing jets of gas convergingly toward

the web and into the space between the web and the plate," and (2) "such space providing clearance for change in direction of the gas of said jets to move in opposite directions from a zone of static superatmospheric pressure established by the jets between the plate and the web."

78. The concept of having nozzle slots so positioned as to have opposing jets of gas converging toward the web abounds in the diagrams, abstract, and claims of Vits '250. Figure 10 of Vits distinctly portrays this with the resulting triangular zone of pressurized medium.

In column 2, lines 57-60, Vits describes jets:

> . . . having edge flows directed towards each other, said edge flows confining spaces tapered in the directions toward the web, in which a static excess pressure is generated. . . .

Claim 4, line 34 indicates:

> It is further desirable that the jet screens be directed towards each other to maintain their effort to fill the build-up spaces during undisturbed flow.

At column 5, line 72, in describing one adoption of his apparatus and method, Vits talks of:

> . . . hollow jets the edge flows of which are directed towards each other and confine a space located on the side of the baffle facing the web and tapered or constructed in the direction toward the web.

or at column 8, line 8:

> . . . so that thedirections of flow of the hollow jets produced by the baffles 13 in both groups are directed towards each other.

79. The second aspect of Claim 4, that the space between the web and the suppression plate provides clearance for the converging jets of fluid to collide and turn back upon themselves as their velocity is overcome by the area of superatmospheric pressure between the jets, is not set forth verbatim in

Vits '250, although the Court finds such a concept to be obvious given the configuration of an air bar described in figure 10 thereof at 159 of the file wrapper. Vits says at column 9, line 49:

> . . . the crest edge of the cushion formed by the top of the triangle is hypothetical only, but the cushions . . . flatten at their upper portions so that the web is supported over a relatively wide area.

Furthermore, in a description in column 10, line 14, Vits says:

> The hollow jet screens confined by the marginal flows 49, 50 and 51, 52 thus have an opposite directional component in addition to the primary flow directed towards the web.

In the file wrapper (DX 300) of the patent in suit at page 145, Gardner argued to the examiners that all of the references of record show jets which are directed toward the face of the web, and in none of them was there any concept of turning the air flow upon itself so that the stream flows in

opposite directions along the face of the web. However, on cross-examination, Gardner admitted this structure and operation is also clearly found in Carlisle '971 (DX 308) (Gardner T. 3177-78.)

Claim 8

80. This claim, the last of those involved in the suit at bar, incorporates all of the subject matter of Claim 1, plus the three requirements: (1) air bars offset longitudinally of the web; (2) each bar comprising positioning structure as defined in Claim 1; and (3) the offset of said bars being sufficient to effect deflection of the web in passing the bars successively. All of these elements are taught in Vits. Offsetting the bars longitudinally of the web is discussed and diagramed at length. The idea of each bar constituting a positioning structure is also covered

in detail. Sine wave positioning, which is the essence of the third requirement, is taught in figure 4 and figure 23 of Vits.

81. The only difference between the claims of the Gardner patent and the prior art Vits '250 (DX 304) was that in Vits, the so-called baffle plate 44 (figure 10) is below the nozzle slots and not as close to the web as the nozzles. Dr. Daane conducted a series of experiements with a scaled model of a Vits bar (figure 10) using wooden inserts to vary the distance from the baffle plate to the surface of the web. These experiments, repeated during the trial, demonstrated clearly that a Vits embodiment devleoped both static and kinetic energy, that there was no difference in the type of static pressure under the Vits or the Gardner teachings, and that the Vits device worked entirely

satisfactorily in "floating" a web. The pressure profiles differed somewhat depending on such factors as the pressure in the plenum (Sp.); the angle of which the jets struck the web; the size of the orifice and the relative closeness or remoteness of the web to the suppression plate or baffle plate. However, the differences were in quantity, not kind, and might or might not be beneficial depending upon how important problems such as weight, strength, dryness, edge flutters, and support of the web were to one.

82. The air bars of Carlisle, Vits, TEC, and possibly Dungler all have both kinds of web supporting forces, that is: (1) direct kinetic impingement of the jets, and (2) static pressure acting over a relatively broad zone.

Dr. Daane testified that his opinion regarding the obviousness of the Gardner invention as related to the prior art was

based on looking at one patent and comparing it with another and that the only knowledge he would need to come to a conclusion was a general fluid mechanics knowledge and was not based on hindsight. The Court notes that those with ordinary skill in the art involved here were graduate engineers with in-depth knowledge of fluid mechanics. To such individuals, it would be obvious to bring the plate 44 of Vits up closer to the web as one sought to maximize static pressure support and diminish the impingement of the jets.

83. A difference between the Gardner claims and the Carlisle Patent No. 3,097,971 (DX 308) was the fact that the Carlisle patent did not show the transverse slots extending beyond the edges of the web. Such is also true of the prior art described in the two British publications (DX 321 and DX 322). But

this was notoriously old in the art. As noted above, the expert Daane had never seen an installation where a web was conveyed by any device that did not extend beyond the extremities of the width of the web. Furthermore, such is clearly taught by Vits.

84. The Meier-Windborst prior art patent (DX 307) teaches the clashing of jets flowing along the web to produce "a stable pressure zone on each of the two sides of the web between the two opposite baffle elements and maintains the web in free suspension between the baffle elements." (column 1, line 51.) In the Meier-Windborst patent, there is a zone of static pressure existing between the web and other objects of various types collectively described as "baffles." As the Court understands Meier-Windborst, these baffles perform a function similar to Gardner's "suppression

plate." The Court views Meier-Windborst as relevant prior art that teaches the use of "a stable pressure zone" and hence important on the issue of obviousness. However, it finds the concept of a zone of superatmospheric pressure much more difficult to conceptualize through Meier-Windborst than under the teachings of other prior art.

85. The Dungler Patent No. Re 24,144 (DX 306) is uncited prior art which may or may not have been considered by the patent office as it contemplated the claims at issue. Its relevancy is hotly contested by the parties. The Court finds it pertinent insofar as it shows clearly that those working in the art in 1953-56 were aware of the creation of air or vapor cushions created between the opening of discharge nozzles and treated webs.

However the thrust of Julien

Dungler's patent claims is the establishment of mathematical ratios involving the distance between the plane of the web and the nozzles as contrasted to the sum of the cross sections of the end faces of the bars and the nozzles as well as the length of the slots. The teachings of these ratios was aimed at increasing the drying or treating efficiency of the device rather than support. In fact, the avowed purpose of Dungler's ratios was to "avoid the formation of air or spent fluid cushions, as well as eddy currents."

The Court finds Dungler to be prior art of only minor relevancy on the issue of obviousness.

86. All of the prior art air bars, despite different nozzle sizes, plenum pressures, nozzle directions, or other variations do, in the Court's view, depend upon the creation of a zone of

superatmospheric pressure to support the web. Whether that support is weak or strong, uniform or variable, progressive or not, as well as the proportions of static pressure and kinetic pressure are matters which vary as these factors are manipulated. But they do not exhibit qualitatively different phenomena, all used static pressure to some degree; all have supression plates or structures equivalent thereto; all have nozzle slots extending transversely of the web, and spaced on opposite sides of the suppression plate or similar structure. The dimensional limitations of Gardner's '477 are essentially meaningless. In short, the Court finds all of the essential elements of the patent at issue in prior art forms. All of the individual mechanical elements of the "invention" of the patent in suit were hence old and the combination of such old elements was

accomplished in accordance with the teachings of the Vits Patent 3,181,250 (DX 304); the Carlisle Patent 3,097,971 (DX 308); the two British articles "The Hover Pulley" of January 1962 (DX 321) and "The Support of Thin Steel Strip on Air Cushions" from the paper of the British Iron and Steel Research ASsociations of December 17, 1962; together with, to a much lesser degree, the teachings of the Dungler Patent Re 24,144 (DX 306) and the Meier-Windhorst Patent 3,041,739 (DX 307).

87. Having proceeded through the analysis required under Graham v. John Deere Co., supra, the Court expressly finds that the subject matter of the patent claims in issue would have been obvious to a person skilled in the art at the time the alleged invention was made.

88. The Court further finds that

the combination of old elements does not produce a synergistic result, i.e., a greater result than the sum of the parts.

89. Nor can the Court find any secondary factors such as long felt, unsolved needs, failure of others in the field, or commercial success to influence the determination of obviousness.

90. In view of these findings, the Court finds that the claims in suit are invalid and unenforceable for obviousness under 35 U.S.C. §103.

Applicability of 35 U.S.C. §285

91. Prior to 1946, there was no provision in the patent law for the award of attorney's fees. By an act amending Revised Statutes 4921 (U.S.C.A., Title 35, Patents, Sec. 70), Congress, in 1946, added language stating:

> The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment in any patent case.
> [U.S. Code Cong. Service 1946, p. 744.]

The intent of Congress was made clear by Senate Report No. 1503, June 14, 1946:

> It is not contemplated that the recovery of attorneys' fees will become an ordinary thing in patent suits, but the discretion given the court in this respect, in addition to the present discretion to award triple damages, will discourage infringement of a patent by anyone thinking that all he would be required to pay if he loses the suit would be a royalty. The provision is also made general so as to enable the court to prevent a gross injustice to an alleged infringer.
> [U.S. Code Cong. Service 1946, p. 1387.]

Thus, Congress made the provision "general"; it was not meant to apply only in favor of plaintiff-patentees or only in favor of alleged infringers. It was not meant to apply solely in situations where infringement had been intentional

or in situations where a patentee had acted fraudulently. Kaehini, et al v. The Diffraction Company, Inc., 173 U.S.P.A. 705, D.C. D. Md. (1972).

The Court in Kaehni went on to comment on the case law that fleshed out the outlines of the provision. It opined that "the exercise of discretion in favor of the allowance of attorney's fees should have its source in unfairness or bad faith on the part of the losing party or in some other equitable consideration such as vexatious or wholly unjustified litigation which makes it grossly unjust for the prevailing party in the particular case to bear the burden of his own counsel fees.

92. In 1952, Congress amended the law and added the phrase "in exceptional cases." Decisions since indicate that the change in wording did not change the standard. Exceptional circumstances

have been interpreted as incorporating concepts of fraud, malice, bad faith, or inequitable or unconscionable conduct on the part of the losing party. Uniflow Manufacturing Co. v. King-Seeley Thermos Co., 428 F.2d 335, 341, cert. denied 400 U.S. 943 (1970). Examples are those in which the patent has been knowingly, intentionally infringed and those in which the patent was originally obtained by fraud. Another example is a plaintiff-patentee who prosecutes on an obviously invalid patent. It has also been held that a case can be exceptional under section 285 where the allegation of infringement is frivolous as asserted without reasonable care or sufficient justification. Ellipse Corporation v. Ford Motor Company, 452 F.2d 163, (7th Cir. 1971), found such case constituted "exceptional circumstances although the facts there were not ade-

quate for an award."

93. A line of cases holds that when the invalidity of a patent is so obvious that anyone skilled in the art, and any competent attorney, must have recognized prior to trial that the patent was invalid, the patent action is prosecuted in bad faith and the defendant may be entitled to attorney's fees under 35 U.S.C. §285. Dole Valve Company v. Perfection Bar Equipment, Inc., 318 F. Supp. 122, 124 (N.D. Ill. 1970).

94. The guidelines for the applicability of section 285 become relevant here because both parties have demanded attorney's fees pursuant to it. Since TEC Systems, Inc. is the prevailing party, the Court must determine whether this case is such as to bring section 285 into play.

95. Defendants alleged throughout the trial that plaintiff was guilty of

not only a lack of candor in dealing with the patent office examiner, but that it also engaged in deliberate, false and material representations to the patent examiner that materially misled that office in its consideration of the applicants' various submissions. Six specific misrepresentations were argued by defendants in their post trial brief and proposed findings. They may be briefly described as:

(a) rigged and misleading tests of Vits' embodiment;

(b) misrepresentation by Gardner that his air bars had been used commercially at speeds of 2,000 feet per minute at R. R. Donnelly Company;

(c) misrepresentations as to the elimination of edge flutter;

(d) misrepresentations as to novelty and function of spacing requirements of the various elements of his

claim;

(e) misrepresentations made in various documents of the file wrapper and plaintiffs' exhibits in Court regarding his PX 31;

(f) Gardner's failure to advise examiner that the German Board of Appeals had rejected his application on the Carlisle patent while telling the United States examiner that the Canadian examiner allowed the Canadian application over Carlisle.

96. The Court has considered each of these allegations within the context and history of this patent application. Mindful of the law's requirement that the exceptional case is not limited to intentional fraud but that an unambiguous showing of extraordinary conduct is required, Airtex Corp. v. Shelley Radiant Ceiling Co., 536 F.2d 145 (7th Cir 1976), the Court is of the opinion that items

(b-f) above do not rise to the level of misconduct required. If they were misrepresentations, they were in the nature of contentions advanced by an enthusiastic proponent of his invention rather than the calculated conduct of one setting out to defraud the U.S. Patent Office, the Court, and the public.

97. Item (a), the allegation of misleading tests of Vits 250, requires separate consideration. It arises for a variety of reasons. Testimony at trial showed that during the prosecution of the patent in suit, it was common knowledge around the Overly plant that "Vits was giving Gardner fits" (Downham T. 1283). During the initial phases of his efforts to obtain a patent, Gardner was consistently being rejected based on Vits' teachings. It was clear that, if his final amendment of claims was to succeed, Gardner would have to somehow

destroy Vits as obvious prior art.

98. Gardner submitted to the Patent Office an affidavit recounting comparative tests made of an embodiment of the Vits air bar as set forth in Figure 10 of Vits' '250 and an embodiment of a standard commercial Gardner air bar pursuant to Figure 7 of application No. 310,531. He professed to the Patent Office that, in his performance comparisons, he scaled the component parts of Vits "to be as nearly as possible identical with the showing of Vits Figure 10 . . . except that it was necessary to reduce the width of thenozzle slots so that we would be able to use an amount of air at least reasonably comparable with the amount of air used in my nozzle. To this end, we made the Vits nozzle slots .030 inches in width as compared with .027 inches in width of the slot in my existing device as shown

in Fig. 7 of this application."

99. Defendants vigorously contend that plaintiff intentionally altered the dimensions of his construction of a Vits embodiment so that the test results were inaccurate, fraudulent, and misleading. Gardner said he endeavored to make everything identical that was posisble; vertical spacing of the nozzle heads from each other; air was supplied under the same pressure and the pressure were varied through identical ranges in the tests thereafter performed. Witness Downham said that what Gardner did was make it virtually impossible for the Vits bar to operate (Downham T. 1318). He further testified that a faithful reproduction of Vits Figure 10 would have meant a nozzle slot width of in the neighborhood of one-tenth of an inch; that Gardner made the width of the suppression plate two and one-quarter inches

and made the length of the angled jet one-half inch, which made the build-up space very large, so large, in fact, that it would virtually be impossible for a .030 orifice to maintain enough flow to keep it (the build-up space) filled (Downham T. 1085).

Considerable trial time was spent in making engineering calculations as to the appropriate velocities if Gardner had accurately compared the performance of the two devices. At one point, Downham testified that, for a faithful to-scale embodiment, the Vits orifice should have been .145 inches or 4.83 times greater than what Gardner used (Downham T. 1095).

100. Witness Daane and Stibbe echoed Downham on the technical impact of Gardner's dimensions of the Vits embodiment. All three felt that the Vits patent was a mdeium speed air bar

and clearly taught the use of a much lower velocity pressure than Gardner.

101. It is true that in the early portions of the trial, the Court and counsel heard a great deal of testimony concerning the pressure profiles developed by plaintiff to demonstrate his belief as to the differences between the Gardner claims and the Vits claims as exemplified by the Gardner version of Vits (PX 31). To the Court, the thrust of this evidence seemed to be that the patent in suit taught web support by uniform static pressure and that Vits taught web support by velocity or impingement pressure. Such a differentiation in quality would have been very important. However, as the trial progressed, and particularly after experts Stibbe and Daane had testified and demonstrated their version of a Vits embodiment with varying thicknesses of wooden inserts so as to

vary the distance between the web and the suppression plate, the Court became convinced that the variations were of quantity rather than quality and that the "cushions" of Vits were the "zone of static pressure" of Gardner. Moreover, the question at this stage is whether or not the examiner was purposefully misled or defrauded by the applicant. The Court believes not. The Patent Examiner very early in the application process found Vits to teach a zone of superatmospheric pressure (DX 300, p. 47). Many of the concepts discussed and demonstrated at trial were at the edge of a fluid mechanics experimentation in 1963. Honest protagonists, even highly trained experts, may well disagree as to the source of aerodynamic phenomenon and this the Court believes is what occurred here.

102. A finding that a case is extra-

ordinary so as to justify attorneys' fees under 35 U.S.C. §285 requires an unambiguous showing of misconduct, fraud or lack of good faith. Arbrook, Inc. v. American Hospital Supply Corp., 645 F.2d 273 (1981). Since a finding is discretionary and will be reversed on appeal only where there has been abuse of such. Here the Court finds that the prosecution by Gardner, while spirited, prolonged and perhaps even abrasively stubborn, was nonetheless carried on in good faith. Hence section 285 is not applicable.

SUMMARY

Jurisdictions and venue being uncontested and the Court having set forth its findings and conclusions herein, it is ADJUDGED that:

(1) the patent in suit is invalid as obvious under section 103;

(2) there is, therefore, no infringement;

(3) the case is not an extraordinary case under 35 U.S.C. §285.

Accordingly, it is hereby ORDERED that judgment be entered for the defendant and that the plaintiff's complaint be DISMISSED.

SO ORDERED this 2nd day of August, 1982, at Milwaukee, Wisconsin.

/s/ Robert W. Warren
UNITED STATES DISTRICT JUDGE

UNITED STATES DISTRICT COURT

FOR THE

EASTERN DISTRICT OF WISCONSIN

THOMAS A. GARDNER

vs. JUDGMENT

TEC SYSTEMS, INC., a Wisconsin corporation, ROY E. DOWNHAM, JACK ECKELAERT and JOHN W. FROST

This action came on for consideration before the Court, Honorable Robert W. Warren, United States District Judge, presiding, and the issues having been duly heard and a decision having been duly rendered.

It is Ordered and Adjudged that Plaintiff's complaint be dismissed and judgment entered for the defendant.

Dated at Milwaukee, Wisconsin, this 2nd day of August, 1982.

SOFRON B. NEDILSKY
Clerk of Court

By Carol Shupe, Deputy